UNIVERSITY AND EDUCATIONAL INTELLIGENCE

UNIVERSITY COLLEGE, LONDON.—The Department of Applied Science and Technology in this college opens on October 2, along with the rest of the college. The instruction in this department includes (1) lectures on different branches of civil and mechanical engineering and surveying and levelling, drawing and practical experimental work in the engineering laboratory; (2) lectures and practical laboratory work in electricity and allied branches of physics; (3) lectures in architecture and architectural construction; and (4) lectures and practical laboratory work in different branches of chemical technology, including brewing, heating and lighting, metallurgy, chemistry of the alkali trade, and agricultural chemistry. Besides these technical and professional lectures, the Faculty of Science provides very complete courses of lectures in mathematics, physics, chemistry, and geology, the sciences upon which the professional knowledge must be based.

ON Tuesday last Mr. F. J. M. Page, B.Sc., F.C.S., was elected Demonstrator of Practical Chemistry at the London Hospital Medical College.

SCIENTIFIC SERIALS

THE *Journal of Anatomy and Physiology*, vol. xvii. part 4, July, 1883, contains: On the action of saline cathartics, by Dr. Matthew Hay.—On the anatomy and physiology of the urinary bladder and of the sphincters of the rectum, by F. Le Gros Clark, F.R.S.—On ten cases of congenital contraction of the stomach, with remarks, by W. Roger Williams (plate 17).—A new rule of epiphyses of long bones, and on the ossification of the temporal bone, by J. B. Sutton (plate 18).—On three cases of cerebellar disease, by Dr. Thomas Oliver.—A contribution to the anatomy of the Indian elephant, by Dr. R. J. Anderson.—On a case of semi-agnatha or synotia in a lamb, by Frederic Eve.—On a case of primary epithelioma of the lung with secondary deposits in the kidney, vertebræ, and ribs, by W. E. Hoyle, M.A. (plate 19).—Researches into the histology of the central gray substance of the spinal cord and medulla oblongata, by Dr. W. A. Hollis (plate 20).—On the membrana tympani, by Dr. J. M. Crombie.—An account of an obturator hernia, and of a fibrous body attached to the hydatid of Morgagni, by W. S. Richmond.

THE *Quarterly Journal of Microscopical Science* for July contains:—On the ancestral form of the Chordata, by Prof. W. Hubrecht (plate 23).—On the renal organs of Patella, by J. T. Cunningham.—On a rare form of the blastoderm of the chick, and its bearing on the question of the formation of the vertebrate embryo, by Dr. C. O. Whitman (plates 24 and 25).—On the development of the pelvic girdle and skeleton of the hind limb in the chick, by Alice Johnson (plates 26 and 27).—On the development of the mole (*Talpa europea*), by Walter Heape (plates 28 to 31).—On the tongue of *Ornithorhynchus paradoxus:* the origin of taste bulbs and the parts upon which they occur, by Edward B. Poulton, M.A. (plate 32).—Observations upon the fœtal membranes of the opossum and other marsupials, by Dr. H. F. Osborn (plate 33).

THE *Journal of the Royal Microscopical Society* for August contains:—On the red mould of barley, by C. G. Matthews (plates 5 and 6).—On the spicules of *Cucumarea hyndmanni, C. calcigera*, and two allied forms, by Prof. F. Jeffrey Bell, M.A. (plate 8).—On a method of preserving the freshwater medusa, by Peter Squire (four grains of bichloride of mercury to a pint of distilled water).—The usual summary of current researches and *Proceedings* of the Society.

THE *American Journal of Science*, September.—On the existence in both hemispheres of a dry zone and its cause, by Arnold Guyot. The presence is determined of two nearly rainless belts on both sides of the tropics, extending round the globe, and embracing most of the so-called deserts of both hemispheres. It is argued that the atmospheric currents, which are the great regulators of aqueous precipitation, are the primary cause of these subtropical dry zones.—On the relations of temperature to glaciation, by George F. Becker. Assuming the correctness of the generally received opinion that the sun is a gradually cooling body, it is concluded that the absolute maximum in the development of glaciers is past, and that the Glacial period was not one of general cold, but one of higher mean temperature at sea-level than the present.—Analysis of two varieties of lithiophilite (manganese triphilite) from Tubbs Farms, Maine, and Branchville, Connecticut, by S. L. Penfield.—On the intensity of sound. I. The energy and coefficient of damping of a tuning-fork, by Charles K. Wead.—The decay of rocks geologically considered, by Dr. T. Sterry Hunt. In this comprehensive memoir the author insists (*a*) on the evidence afforded by recent geological studies of the universality and antiquity of subaërial decay both of silicated crystalline rocks and of limestones, and of its great extent in pre-Cambrian times; (*b*) on the preservation of the disintegrated materials *in situ*, wherever they have been protected from denudation by overlying strata, or by their position in places sheltered from erosion, as in the Appalachian and St. Lawrence valleys; (*c*) on the insignificant results of this process of decay since the Glacial period owing to the relatively short duration of that period, and probably also to changed atmospheric conditions in recent times; (*d*) on the fact that the process has furnished the materials both for the clays, sands, and iron-oxides from the beginning of the Palæozoic to the present time, and for the corresponding Eozoic rocks formed from the older feldspath rocks by the partial loss of protoxide bases. The decay of sulphuretted ores in the Eozoic rocks has also given rise to oxidised iron ores and to deposits of rich copper ores in various geological regions; (*e*) that the rounded masses of crystalline rocks left in the process of decay constitute not only the boulders of the drift, but, judging from analogy, the similar masses in conglomerates of various ages from Eozoic times.—On Mr. Glazebrook's paper on the aberration of concave gratings, by H. A. Rowland.—On the stibnite from Japan, by Edward S. Dana. The author fully describes and illustrates the remarkable series of specimens of crystallised stibnite from Mount Kosang in the Island of Shikoku, South Japan, which have recently come into the possession of the Yale Museum.—Notes on the volcanoes of Northern California, Oregon, and Washington Territory, by Arnold Hague and Joseph P. Iddings.—Cassiterite, spodumene, and beryl in the Black Hills, Dakota, by William P. Blake.—Discovery of a new planetoid on the night of August 12, by C. H. F. Peters.

THE *American Naturalist* for June, 1883, contains:—Pearls and pearl fisheries, part i., by W. H. Dall.—Aboriginal quarries: soapstone bowls and the tools used in their manufacture, by J. D. McGuire.—Annelid messmates with a coral, by J. W. Fewkes.—Progress of invertebrate palæontology in the United States for the year 1882, by Dr. C. A. White.—Notes on the genus Campelona of Rafinesque, by R. E. Call.—Mosses, by W. W. Bailey.—Emotional expression, by A. T. Bruce.—The developmental significance of human physiognomy, by C. D. Cope.

July, 1883, contains:—The Naturalist Brazilian expedition, No. 2: the lower Jacuhy and Sao Jeronymo, by H. S. Smith.—Growth and development, by C. Morris.—Pearls and pearl fisheries, part 2, by W. H. Dall.—Catlinite: its antiquity as a material for tobacco pipes, by E. A. Barber.

August, 1883, contains:—Means of plant dispersion, by E. I. Hill.—On the classification of the Linnean orders of Orthoptera and Neuroptera, by A. S. Packard, jun.—On the power of scent in the turkey vulture, by S. N. Rhoads.—The Siphonophores (illustrated), by T. Walter Fewkes.

Annalen der Physik und Chemie, July 15.—Theory of dispersion, by L. Lorenz.—On the elliptical polarisation by reflection from the surfaces of transparent bodies, by A. C. van Ryn van Alkemade.—The coefficient of refraction of some mixtures of alcohol and aniline, by W. Johst (with tables).—Remarks on E. Lommel's treatise "Concerning Newton's Rings," by Karl Exner.—On a method of comparing electrical resistances independent of the resistance of the leads, by F. Kohlrausch.—Some determinations of the absolute resistance of a chain by means of an earth inductor and a galvanometer.—Concerning the effect of polarisation with alternating currents, by A. Winkelman.—Quantitative determination of the influence of the changes of temperature produced by extension upon the measurement of the former, by Dr. A. Miller of München.—On the admissability of the acceptance of an electric sun potential and the effect of its interpretation on terrestrial phenomena, by Werner Siemens.—Researches in gaseous constitution of heavenly bodies, by A. Ritter of Aachen.—On the reduction of the fundamental units of mechanics to their elements, by E. Budde.—On a new fluid of high specific weight, of high refractive index and great dispersion, by Carl Rohrbach (with tables).—On the correct writing of some expressions of Arabic origin used in the art of measuring, by K. Zöppritz.

Bulletin of the Belgian Royal Academy of Sciences, July 27.—On the influence exercised by the respiratory process on the

circulation of the blood, by Messrs. Em. Legros and Griffé. From experiments made on the dog, cat, horse, pig, sheep, rabbit, and other animals, Magendie's dictum that pressure is diminished during inspiration and increased during expiration appears to be normally true in the case of the pig alone.—On the existence and cause of a monthly periodicity of the aurora borealis, by M. Terby. The paper is accompanied by a table of magnetic disturbances at Brussels during the years 1870-82 arranged in monthly decades. The existence of a monthly periodicity is demonstrated, and from a series of remarkable coincidences it is suggested that in this periodicity is reflected the duration of the rotation of the sun round its axis. It is further argued that the magnetic perturbations accompanying the aurora borealis, which are closely associated with the appearance of solar spots, are probably subject to the same vicissitudes as the auroras, and to the same periodicity.—Two memoirs on steam-engines, locomotives, breaks, and railway rolling stock, by M. Delacy.—Remarks on the force of the word *discovery* as applied to the Iguanodons of Bernissart, by M. P. J. van Beneden. The discovery of the large specimen recently exposed to public view in the court of the Brussels Natural History Museum, a full account of which appeared in NATURE, September 6 (p. 439), is referred to M. Fagès. But M. van Beneden shows that he was the first to determine the connection of these gigantic fossils with the Iguanodon family.—On some remains of fossil Cetacea collected in the phosphorated rocks between the Elbe and Weser, by M. P. J. van Beneden.—The following theorem is communicated by M. Catalan: a, x, y being integers, every value of x satisfying the equation $(a^2 + 1)\,x^2 = y^2 + 1$, is the sum of three positive squares, with the exception of $x_1 = 1$ and $x_2 = 4a^2 + 1$.—On some autographs of Grétry, the famous composer of Liége, by M. Ed. Fétis.—On some desiderata in the history of art in Belgium, by M. Ed. Mailly.

Archives of Physical and Natural Sciences, Geneva, August 15.—On some remarkable movements occasionally accompanying the fall of hailstones, by M. Daniel Colladon.—Memoir on earthquakes and volcanoes, by Prof. F. Cordenons. In this first part of a comprehensive study of underground phenomena the author gives a general classification of seismic disturbances, and examines the various hypotheses hitherto proposed to account for them.—On the nomenclature of fossils in connection with the recent discussions on botanic nomenclature, by M. Alph. de Candolle.—On the American ants (concluded), by M. H. de Saussure.—On the movements of the ground recorded at the Neuchatel Observatory, by Dr. Hirsch.—Meteorological observations with tables of temperature and barometric pressure made at the Observatory of Geneva and on the Great Saint Bernard during the month of July.

Rendiconti of the Reale Istituto Lombardo di Scienze e Lettere, July 26, 1883.—Experimental studies on the parasite of tuberculosis (Robert Koch's *bacillus*), by Prof. G. Sormani and Dr. E. Brugnatelli. The conclusions of Charnley Smith (*Brit. Med. Jour.*, January, 1883) regarding the detection of the bacilli of tubercle in the breath of consumptive patients are not confirmed. Hence consumption would not appear to be infectious.—Cure of pneumonitis effected by the cold water method of treatment, by Prof. C. Golgi.—On the quaternary vegetable fossils recently discovered by G. B. Dell' Angelo in the Re district, Val Vegezzo, by Prof. F. Sordelli.—Remarks on the various methods of distributing the current to a system of electric lamps, by Prof. R. Ferrini.—On the Institution of International Law and its operations during the years 1879–83, by C. C. Norsa.—Meteorological tables for the month of July prepared at the Royal Brera Observatory, Milan.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 21.—"Contributions to our Knowledge of the Connection between Chemical Constitution, Physiological Action, and Antagonism." By T. Lauder Brunton, M.D., F.R.S., and J. Theodore Cash, M.D.

In this paper the authors show that the physiological action of salts of ammonia varies considerably according to the acid with which the ammonia is combined. They all affect the spinal cord, motor nerves, and muscles, and tend finally to paralyse these structures. The course of poisoning varies: the chloride has at first a stimulant action on the cord while with the iodide this is less marked, and the paralysing action is more distinct. The iodide, sulphate, and phosphate paralyse motor nerves more powerfully than other salts, the iodide being the most powerful of all.

Nineteen salts of the compound ammonias were investigated. They affect the spinal cord, motor nerves, and muscles.

There is a marked difference in action between ammonia and the compound ammonias; while ammonia causes well marked tetanus, compound ammonias as a rule produce symptoms of motor paralysis, with the exception of those in which only one atom of hydrogen is substituted by an alcohol radical. This paralysis appears to be partly due to their action on the spinal cord and nerve centres, and partly to a curara-like action on the motor nerves.

Some of them apparently increase somewhat the excitability of the spinal cord at first, but this is temporary, and is shown rather by hyperæsthesia or tremor than by convulsion; and tetra-methyl and ethyl-ammonium salts differ from the di- or tri-methyl or ethyl-ammonias in having a much greater tendency to cause convulsions.

The effect of the acid radical on the physiological action is less marked in the case of the compound ammonias than in the salts of ammonia itself. The iodides of the compound ammonias paralyse motor nerves more quickly than either chlorides or sulphates.

Salts of methyl, ethyl, amyl ammonium are more active than the corresponding ones of the di- and tri-compounds, but the tetra-compounds are most active of all.

In the next part of the paper the effect of the salts of alkalies on muscle and nerve are considered. The substances investigated were the chlorides of lithium, sodium, potassium, rubidium, and cæsium. These differ from ammonia in having very little tendency to stimulate the spinal cord, and the chief symptom of poisoning by them is increasing torpor. Slight excitement of reflex action is noted at first in the case of potassium and rubidium.

The motor nerves are not paralysed by cæsium or rubidium, except in very large doses, but the other substances of this group paralyse them to a greater or less extent. Lithium and potassium are the most powerful.

The contractile power of muscle (as shown by the height of curve) is increased by rubidium, ammonium, potassium, and cæsium. It is unaffected by sodium excepting in large doses, and is almost invariably diminished by lithium.

The action of substances belonging to the alkaline earths and earths is discussed in the next section. The substances investigated were the chlorides of calcium, strontium, barium, beryllium, didymium, erbium, and lanthanum. In regard to their action upon the nervous system, these substances fall into two groups: (*a*) containing beryllium, calcium, strontium, and barium; and (*b*) containing yttrium, didymium, erbium, and lanthanum. Group *a* has a tendency to increase reflex action, as evidenced by spasm or tremor. Group *b*, reflex action in the cord appears to be little affected, but they appear to have a tendency to paralyse motor centres of the brain in the frog. Group *a* all paralyse motor nerves to some extent. Lanthanum has also a slight paralysing action, but the other members of group *b* have not, agreeing in this respect with sodium and rubidium, and differing from all the others. The *contracture* produced by barium is enormous, resembling that produced by veratria, as the authors have shown in a former paper. It is like that of veratria diminished by heat, cold and potash, and may be abolished by these agents. It is not so well marked when the drug is injected into the circulation, as when locally applied to the muscle.

The action of some of the more important of those drugs can be graphically represented by a spiral, the terminal members of which are potassium and barium, and these two are to a certain extent connected by ammonium as an intermediate link.

The alterations effected in the action of the different members of these groups on muscle by the subsequent application of another is next discussed, and it is shown that the effect of one substance upon muscle may be increased or diminished by the application of another. One of the most curious points is that two substances having a similar action may, instead of increasing, neutralise each other's effect.

Barium, calcium, strontium, yttrium, and beryllium cause a great prolongation of the muscular curve or *contracture*. Some relations are pointed out between the atomic weights of antagonising elements of which the data are too limited to draw from them any general rule, but the authors think that they may possibly lead by and by to some useful result. Thus rubidium in large doses has the same effect as barium in causing a veratria-like curve, but barium destroys the effect of rubidium before producing its own effect.